

Dirty deeds done dirt cheap: dealing with RDDs

In the current security environment there is growing concern that non-fissionable radioactive 'source' materials might be used for terrorist or other hostile purposes by means of a radiological dispersion device (RDD) or so-called dirty bomb. An RDD is a weapon that uses a conventional explosive, such as dynamite, to disperse radioactive material. As Professor Peter Zimmerman of King's College London (a former advisor to the US Department of State on this subject) explained in an interview with VERTIC, although the immediate death toll resulting from the use of an RDD would likely be no greater than that resulting from the use of a conventional bomb, the psychological effects of such a radiological attack, and the ensuing social, economic and political ramifications, could be severe.

The use of RDDs is difficult to prevent due to the proliferation of source materials around the globe and the poor state of accounting, monitoring and control. As discussed by Klaas van der Meer in VERTIC's *Verification Yearbook 2003*, radioactive sources like radioisotopes have been used for decades in a variety of legitimate activities: to diagnose and treat illnesses; to sterilize equipment; to inspect welding seams; to monitor oil wells and water aquifers; and to preserve food. Most of these sources are only mildly radioactive and have short half-lives. Individually they pose little radiological risk, and, therefore, do not attract the level of security usually (but not always) afforded to the more dangerous nuclear materials used in nuclear weapons, such as high-enriched uranium (HEU) and plutonium.

Compounding the problem is the fact that, during the Cold War, from the 1950s onwards, the United States under its Atoms for Peace programme, and the Soviet Union under a similar initiative, provided largely unknown quantities of radioactive material to other countries, ranging from reactor fuel, including HEU, for research reactors, to low-enriched uranium and radioactive source materials. Lost or 'orphaned' sources are another major concern. One article of radioactive source is reportedly lost each day in the US alone, with approximately only half being eventually recovered. While any type of radioactive material would be of interest to terrorists, for an RDD, it is much easier to seize it from the thousands of facilities that use low-level sources, such as factories, hospitals and universities.

By and large the onus falls on national governments to control radioactive sources in their territories. While many that have regulatory systems already in place are upgrading them as a matter of urgency, others lack the resources or the national structures to control radioactive sources effectively. There is currently no international agreement that establishes standards of accountancy, monitoring and control. The most important existing treaty in the area is the 1980 Convention on the Physical Protection of Nuclear Material, but this only regulates international nuclear transport.

In this issue . . .

Kristie Barrow assesses attempts to deal with the RDD threat, while Jessica McLaughlin examines nuclear verification technology research in the US. Plus all of the usual features: Verification Watch, Science and Technology Scan, Peace Missions Monitor, Verification Quotes and VERTIC News and Events.

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The International Atomic Energy Agency (IAEA), through its nuclear safeguards system, plays an important part in ensuring the security of highly radioactive material that might be used in nuclear weapons. Increasingly, however, the Agency has identified one of its priorities as being to ‘assist States in creating and strengthening national regulatory infrastructures to ensure that . . . radioactive sources are appropriately regulated and adequately secured’. In 2001 it established a Nuclear Security Fund, amounting to US\$23 million, to assist states, inter alia, in locating and securing orphaned radioactive sources, detecting illicit nuclear smuggling and establishing strong national regulatory oversight bodies and national source registries. The IAEA has long maintained an Illicit Trafficking Database and has fostered a Code of Conduct on the Safety and Security of Radioactive Sources.

Recent developments

In May 2004 the United States announced a US\$450 million Global Threat Reduction Initiative (GTRI) to address the threat posed by the entire spectrum of nuclear materials. In particular it aims to repatriate radioactive material from high-risk locations around the world, with a focus on recovering HEU from Soviet-era research reactors, which have long been a concern to the US because of poor maintenance and lax security. Russia and the US have reached agreement regarding 24 reactors in former Soviet states, Eastern Europe and Southeast Asia. The US will meet the US\$100 million cost incurred by the Russians in returning both fresh and spent nuclear fuel to Russia. This agreement is also seen as a way of accounting for a large amount of previously undocumented radioactive material. Although initially targeted at highly radioactive materials, the programme is expected to have a significant ‘trickle-down’ effect on the availability of less radioactive material that might be used in a dirty bomb.

Encouragingly, in June 2004 the Group of Eight (G8)—at a summit held at Sea Island off the coast of Georgia, US—offered to help states implement United Nations (UN) Security Council resolution 1540, adopted in April 2004. The resolution obliges all UN member states to pass laws criminalizing proliferation by non-state actors, and to establish physical protection, accounting, export control and illicit trafficking prevention measures for weapons of mass destruction (WMD) and related materials, including radioactive source material.

The international effort to improve accountancy, monitoring and control in respect of radioactive source material for RDDs has only just begun. While the US and G8 initiatives are a good start, a great deal more is required. The ultimate goal should

Verification Quotes

‘My message today to all the world is to open up Dimona reactor to inspectors.’

Mordechai Vanunu on his release from prison after serving 18 years for revealing that Israel had nuclear weapons, quoted in *The Times*, 22 April 2004, p. 41.

‘The report is being viewed seriously because it originates from outside US intelligence sources.’

An IAEA official commenting on reports that Iran has a parallel nuclear programme that it has hidden from inspectors, quoted in ‘Report alleges hidden Iran nuclear activities; Tehran readmits inspectors, restarts uranium processing’, *Global Security Newswire*, 29 March 2004.

‘In order to detect and prevent violations of the [1968 Nuclear Non-Proliferation Treaty], verification mechanisms need to be reinforced and further developed. Verification and confidence-building require full transparency.’

Foreign Ministers Laila Freivalds of Sweden, George A. Papandreou of Greece and Erkki Tuomioja of Finland, ‘Toughen the treaties’, *International Herald Tribune*, 27 January 2004, p. 7.

‘And for Donna Phillips, 66, whose husband, Hubie, has Alzheimer’s disease, the ability to strap a GPS [Global Positioning System]-enabled bracelet from Whereify Wireless on her husband when he goes out has meant an end to panicked searches when he fails to come home.’

Amy Harmon, ‘Lost? Hiding? Cellphone tells’, *International Herald Tribune*, 22 December 2003, pp. 1 and 6.

‘Verifiable nuclear dismantling reflects a US intention to spy on our military capabilities before starting a war.’

Radio Pyongyang, 27 March, reported in Joseph Kahn, ‘North Korea rejects US demand to scrap its nuclear programs’, *New York Times*, 28 March 2004, www.nytimes.com.

‘In the 23 months I was there, I never saw anything that I would characterize as evidence of weapons of mass destruction. There were allegations and assertions by people. But I’ve been around a hell of a long time, and I know the difference between evidence and assertions and illusions or allusions and conclusions that one could draw from a set of assumptions.’

Former US Treasury Secretary Paul H. O’Neill, quoted in Richard W. Stevenson, ‘Bush sought to oust Hussein from start, ex-official says’, *New York Times*, 12 January 2004.

‘New York law professor Ronald Goldstock has proposed that “independent, private sector inspector generals” or IPSIGs, be appointed to go into charities and report back to government if they violate some rule or regulation.’

Mathew Little, ‘Inspectors mooted for NI sector’, *Third Sector*, 10 March 2004, p. 1.

be to achieve uniformly high standards worldwide, if necessary through international law, lest terrorists and others simply target the system at its weakest point.

Kristie Barrow, VERTIC intern

US labs research nuclear verification too

Not only does the US outspend all other nations on nuclear weapons, it also spends vastly more on researching and developing nuclear verification technologies. Overseen by the Department of Energy (DOE), the Office of Nonproliferation Research and Engineering—part of the National Nuclear Security Administration—is charged with managing and administering these programmes, while most of the research itself occurs at DOE-run national nuclear weapon laboratories.

The Nonproliferation and Verification Research and Development (R&D) Program of the Office of Nonproliferation Research and Engineering has two major foci: proliferation detection; and nuclear explosion monitoring. With a budget of almost US\$112 million, the Proliferation Detection Program aims to develop, demonstrate and deliver long- and short-range sensor technologies to detect the spread of nuclear (and chemical and biological) weapons, materials and technologies. The Nuclear Explosion Monitoring Program, with an annual budget of approximately US\$100 million, is working to develop and manufacture ground- and satellite-based sensors and to produce computer software for detecting, locating, identifying and characterizing nuclear explosions, whether underground, underwater, in the atmosphere or in space.

Most nonproliferation and verification R&D funding is earmarked for contracts related to NNSA-designed projects. Although most are awarded to national laboratories, some are given to universities or private companies. The national laboratories were originally created to design and build nuclear weapons, but have expanded their activities to include basic and applied research in a variety of disciplines and now lead the field in the development of most defence-related technologies, including verification technology. Verification technology research primarily occurs at three of the 22 federally-funded nuclear weapon laboratories: Lawrence Livermore; Los Alamos; and Sandia. The most notable work being done outside of the 'big three' is at Pacific Northwest National Laboratory, which has a small project on radionuclide detection technology.

Lawrence Livermore National Laboratory

The Lawrence Livermore National Laboratory (LLNL) is currently focusing on improving technologies to locate and identify regional seismic events to support nuclear explosion

monitoring. Engineers are working on models to target specific regions of interest and on tools to incorporate automatically newly acquired data into these models. The laboratory is also developing and testing gamma and neutron detectors for locating radioactive material. The LLNL is a member of an inter-laboratory team investigating methods of establishing a scientific basis for determining the origin of fissile material and serves as the inter-laboratory coordinator for the testing of optical remote sensing techniques for WMD proliferation detection and characterization. Finally, the LLNL is a recognized national leader in the development of hyperspectral analysis methods (combining images from the infrared, visible and ultraviolet ranges) for remote detection of gases and other materials.

Lawrence Livermore's Center for Nondestructive Characterization (CNC) is engaged in research on the measurement of physical properties such as molecular composition, density and thermal properties and on fast nanoscale imaging, which produces high-resolution multidimensional images. These are useful tools for verifying reductions in, and the elimination of, nuclear armaments. Its Engineering Directorate also is engaged in verification-relevant projects, including the use of unmanned aerial vehicles (UAVs) for wide-area monitoring, and ultrasonic non-destructive evaluation of multilayered structures that enables the examination of hard-to-assess areas of physical objects.

Los Alamos National Laboratory

The Los Alamos National Laboratory (LANL) focuses on the enhancement of analytic tools and sensors to discriminate earthquakes and industrial activities from nuclear explosions. Scientists are working to deliver the next generation of satellite-based electromagnetic pulse sensors. Satellite-based monitoring has been a long-standing US 'national technical means' of verification, beginning with the first *Vela* satellite, launched in 1963 to monitor compliance with the 1963 Partial (or Limited) Test Ban Treaty. Scientists are also designing autonomous, hand-held radiation detection systems for use in on-site nuclear test monitoring. Another LANL team is working to develop innovative algorithms and specialized processors to transform voluminous quantities of remote sensing data into the form required by decision-makers.

Los Alamos' Nonproliferation Program has a number of projects concentrating on monitoring nuclear facilities and nuclear weapons dismantlement in Russia. The Safeguards Systems Group is working to improve safeguards for fissile material accountancy and security at DOE sites and to develop advanced surveillance technologies to detect anomalous activities and situations that may constitute a security threat. The Safeguards Science and Technology Group, meanwhile, is developing non-destructive assays of nuclear and hazardous material for monitoring and nuclear accountancy purposes.

Sandia National Laboratory

The Sandia National Laboratory (SNL) is researching improvements in data processing and analysis in support of nuclear explosion monitoring. Like Los Alamos, the SNL is also developing new detectors for the next generation of satellite-based nuclear explosion detectors. In addition the SNL is the national centre for research on Synthetic Aperture Radar systems, which provide imagery in inclement weather or at night.

The Cooperative Monitoring Center (CMC) at Sandia, outside the secure area, is equipped with laboratories and test facilities to provide international training in cooperative monitoring technologies, and to support international collaboration in their further development. Its Material Monitoring Systems Laboratory develops computer systems for material monitoring in nuclear facilities. Its Outdoor Test Facility simulates a border monitoring situation to permit the testing of sensors, video systems and operating policies. The CMC also boasts a Technology Training and Demonstration area that provides hands-on experience of monitoring technologies developed at Sandia and other laboratories to visitors and laboratory personnel. Its equipment is all unclassified and not subject to export controls, enabling it to be used worldwide.

Coordination challenges

As evidenced by the partially overlapping projects at the different sites, competition is built into the national laboratory system. Since resources are limited, however, duplication of research is undesirable and specialization among the laboratories has been encouraged. The creation in 2002 of the Department of Homeland Security (DHS), which took over some of the NNSA's anti-terrorist technology research initiatives, notably those relating to chemical and biological terrorism, has led to new coordination challenges. Although the DHS focuses on counterterrorism and the NNSA on nonproliferation, these areas are sufficiently related to warrant collaboration

VERTIC in Brief

VERTIC Brief 2, April 2004—'93+10: strengthened nuclear safeguards a decade on'. Kenneth Boutin considers progress made in strengthening IAEA safeguards 10 years after the so-called 93+2 programme was launched in 1993, following the discovery of Iraq's clandestine attempts to acquire nuclear weapons.

VERTIC Brief 3, April 2004—'The Comprehensive Nuclear Test Ban Treaty: virtually verifiable now'. Ben Mines provides a progress report on the establishment of the verification regime for the CTBT, which bans nuclear tests in all environments.

VERTIC Brief 4, February 2004—'Biological weapons: minding the verification gap'. Trevor Findlay explores the strengths and weaknesses of the BWC, focussing on attempts to improve its ineffective verification and compliance systems.

See www.vertic.org for further details.

and the exchange of information. Both agencies rely on the same national laboratories for research and need to develop a strong partnership to maximize productivity and minimize the potential for duplication.

Unfortunately, no such partnership has yet been established. According to a May 2004 General Accounting Office (GAO) report, the NNSA provided the DHS with copies of its project proposals for 2004, but the DHS did not reciprocate, allegedly due to time constraints. However, in a 12 May 2004 letter commenting on a draft of the GAO report, the DHS noted that collaboration between the groups is increasing and that staff members have recently held numerous joint meetings to discuss common interests and project goals.

Internal coordination of NNSA projects is another area of debate. Due to mounting pressure arising from terrorist threats, there has been criticism of the balance that the NNSA has struck between long- and short-term research. Although traditionally the tendency has been to invest in long-term projects requiring major continuing investment, there is concern that this strategy may be hampering the development of technology that is needed today. While this may be valid in respect of urgent means for combating terrorism, R&D designed to produce technology and techniques for effective verification of nuclear arms control and, ultimately, nuclear disarmament, needs to be sustained and long-term.

Jessica McLaughlin, VERTIC Intern



Small beginnings 1: Israeli nuclear transparency

Israel creaked open the door to its highly secretive nuclear programme on 4 July when the Israel Atomic Energy Commission launched its new website (www.iaec.gov.il). The effort to demonstrate transparency came just days before IAEA Director General Dr Mohamed ElBaradei arrived in the country for a brief visit. Yet the website offers little for those who do not read Hebrew. The English version consists of only one page, limited to basic information and two long-distance photographs of Israel's nuclear facilities. Making no reference to nuclear weapons, the website claims that the nuclear reactor outside the southern town of Dimona is for 'expanding and deepening basic knowledge of nuclear science and related fields and providing an infrastructure for the practical and economic utilization of atomic energy'. As Israel is not party to the 1968 Nuclear Non-Proliferation Treaty (NPT), it is not obliged to declare its nuclear weapons or agree to restrictions on, or inspections of, its nuclear activities. Under its policy of 'strategic ambiguity', Israel will neither confirm nor deny its nuclear weapon capabilities.

During Dr ElBaradei's visit, however, Prime Minister Ariel Sharon said he is ready to consider a nuclear weapon-free zone in the Middle East as part of future peace talks. Whether Israel will follow these overtures with real transparency vis-à-vis its nuclear programme remains to be seen.

Sources Israel Atomic Energy Commission, www.iaec.gov.il; 'Israeli web site on nuclear programs offers little that is new', *New York Times*, 5 July 2004, www.nytimes.com; 'UN: Sharon ready to discuss nukes', *USA Today*, 8 July 2004, www.usatoday.com.

Small beginnings 2: India/Pakistan confidence-building

Indian Foreign Secretary Shashank and his Pakistani counterpart, Riaz Khokar, met in New Delhi, India, on 28 June, resulting in modest confidence-building initiatives. Shashank and Khokar agreed: to develop a system to provide advance notification of missile tests; to extend their unilateral nuclear test moratoria; and to establish a 'hotline' to reduce the potential for misunderstandings that could lead to nuclear war. Formal talks between Indian External Affairs Minister Natwar Singh and Pakistani Foreign Minister Khurshid Mahmud Kasuri are scheduled for late August.

Major breakthroughs should not, however, be expected: at this stage the talks are primarily designed to build trust between the two sides. Indeed, a number of developments have threatened to raise new tensions. Pakistani President Pervez Musharraf, for example, in July announced plans to conduct 'an extremely important missile test' in the near future. And India's new Congress I Party government has declared that defence spending will rise by 30 percent in 2005, with some of the new funds earmarked for ballistic missile deployments.

Sources 'Pakistan pledges peace with India', BBC News, 20 July 2004, <http://news.bbc.co.uk>; 'South Asian tensions are easing, Armitage says', Global Security Newswire, 19 July 2004, www.nti.org; 'Nuke hotline for India, Pakistan', CNN, 20 June 2004, www.cnn.com; 'Pakistan and India agree to peace talks', *Washington Post*, 19 February 2004, www.washingtonpost.com; 'Peace process in South Asia', Carnegie Analysis, 19 February 2004, www.ceip.org.

Kyoto Protocol: progress, but are the Russians coming?

VERTIC participated in the twentieth sessions of the Subsidiary Bodies to the 1992 United Nations Framework Convention on Climate Change (UNFCCC), known as SB 20, from 16–25 June in Bonn, Germany. Although rarely mentioned at the event, Russia's purportedly imminent ratification of the 1997 Kyoto Protocol to the UNFCCC helped foster a constructive working atmosphere. Having heard such declarations before, however, participants were not holding their breath.

Reporting, monitoring and verification issues were discussed in detail. National communications are the primary means by which states parties report on their implementation of the convention. Discussions on what the timing for the submission of these reports should be and on related funding issues were difficult. However, agreement on the timing issue seems closer than ever before. Determining a schedule for the submission of national greenhouse gas (GHG) inventories by non-Annex I states was also discussed but no agreement was reached.

Meanwhile, the Subsidiary Body for Science and Technological Advice (SBSTA) delved once again into the labyrinthine complexities of developing good practice guidance on land use, land use change and forestry (LULUCF) reporting. Common reporting format tables were agreed for most issue areas. Other discussions were held on harvested wood products, definitions and methodological options concerning the degradation of

forests, and devegetation. Also considered were small-scale afforestation and reforestation project activities under the Clean Development Mechanism—whereby developed states parties earn certified emissions reduction units for implementing climate friendly projects in developing nations. Delegates in the Subsidiary Body for Implementation (SBI), especially those from developing countries, expressed concern that the intricacy of discussions on LULUCF and CDM issues precludes the participation of some developing states. It is feared, moreover, that the rules will present difficulties when put into practice, especially with regard to monitoring procedures. Unsurprisingly, little headway was made in the particularly divisive area of methodologies for calculating and reporting on emissions from fuel used in international aviation and maritime transport.

Many side events involving NGOs, research organizations, intergovernmental agencies and government representatives were held during SB 20 on subjects ranging from current issues relating to mitigation and adaptation to future possibilities for the climate change regime. Of particular importance from a monitoring and compliance perspective was a meeting that evaluated progress on national registries and the transaction log for emissions trading. The independent transaction log, which checks transactions against Kyoto's rules and ensures their integrity and which is being designed by the UNFCCC Secretariat, is expected to be implemented by mid-2005. National registries for the accounting of emissions units are expected to be implemented between 2005 and 2007.

Sources Andrew Howard, 'Building the systems of emissions trading: progress with registries and the transaction log', SBSTA UNFCCC Side Event, 22 June 2004; 'Summary of the Twentieth Sessions of the Subsidiary Bodies of the UNFCCC', *Earth Negotiations Bulletin*, 28 June 2004, www.iisd.ca/climate/sb20; 'A brief analysis of the SB-20 side events', *Earth Negotiations Bulletin*, 28 June 2004, www.iisd.ca/climate/sb20/enbots.

EU Emissions Trading Scheme: getting ready for 2005

The European Commission (EC) appears to be making a concerted effort to ensure that the Emissions Trading Scheme (ETS) of the European Union (EU) gets off to a smooth start, as planned, in 2005. First, it is sending final written warnings to 11 of the EU's 15 member states (pre-enlargement)—except Austria, France, Germany and Sweden—for not fully incorporating the Emissions Trading Directive into national law, as required, by 31 December 2003. Second, the EC has announced infringement proceedings against six EU member states (Belgium, France, Greece, Italy, Portugal and Spain)

for failing to submit national allocation plans (NAPs). Behind this enforcement action, however, lies recognition by the EC that, in many cases, draft implementing legislation is under parliamentary consideration and that attention is being focussed on developing the NAPs. The EC has also recognized the political sensitivity over NAPs and has thus decided merely 'to begin preparations' for infringement proceedings to hasten their adoption. This tactic seems to have worked: only Greece and Italy were sent first written warnings in July for failure to submit their NAPs.

Meanwhile, commercial companies concerned about the ETS have predicted that the EC will only make limited use of its veto power for NAPs that are too generous in their allocation. Generous NAPs have, so far, caused the carbon market to slump. EU Environment Commissioner Margot Wallström stressed, though, that the EC has a legal obligation to block NAPs that may weaken or distort the market.

Behind the scenes, considerable work is underway in many different sectors to ensure that an effective verification system is in place for the ETS. Following the International Emissions Trading Association (IETA) meeting on 'A Harmonized way Forward on Verification within the EU Emissions Trading Scheme', held in Brussels, Belgium, on 27 May, considerable progress has been made in regard to establishing an effective verification system for the ETS. The European Accreditation Body has set up a working group to develop a GHG Guidance Note. The IETA itself has created several new working groups to develop, inter alia, GHG Auditor Training Programme requirements, GHG Auditor Competence requirements and a GHG Verification Protocol. It is hoped that the GHG Auditor Training Programme and GHG Auditor Competence requirements will be completed by the end of August and the GHG Verification Protocol by October.

Looking ahead, enthusiasm for linking the ETS to other emissions trading schemes is growing. Such linkages are an effective means of promoting global climate action, but it is crucial that all schemes have credible verification systems in order to guarantee their integrity. It is encouraging that the Californian Climate Action Registry has recognized that verification is fundamental to any emissions trading system.

Sources 'EU "won't enforce tough emissions trading plans"', *ENDS*, 13 May 2004, www.environmentdaily.com; 'EU governments out of time on climate trading', *ENDS*, 18 May 2004, www.environmentdaily.com; 'Emissions trading: Commission takes legal action to speed up member states' preparations', *EUROPA Press Release*, 7 July 2004, www.europa.eu.int; 'The International Emissions Trading Association (IETA) joins California Climate Action Registry', *IETA Press Release*, 29 March 2004, www.ieta.org.

Human rights monitoring hot up

The United Nations High Commissioner for Human Rights, Louise Arbour, has established a five-member UN team to investigate reports of serious human rights violations in Côte d'Ivoire, following violent clashes in June in rebel-held territory in the north of the country. The mission forms part of the human rights division of the United Nations Mission in Côte d'Ivoire (ONUCI), which has a Security Council mandate to promote human rights and to help investigate violations under resolution 1528 of 27 February 2004. The team, headed by Gerard Balanda, a judge from the Democratic Republic of the Congo (DRC), will conduct interviews and gather information in Côte d'Ivoire and neighbouring countries. The move follows an earlier investigation by a three-member UN fact-finding team, which concluded that at least 120 people had been killed during an opposition rally by government and associated paramilitary forces.

In Uzbekistan, the authorities have announced that civil society groups will be allowed to monitor human rights in prisons where widespread abuse is believed to have occurred. This follows their unprecedented decision in May to allow foreign observers to be present at the autopsy of an alleged torture victim. The human rights monitors will receive two to three months of training before they conduct the visits, during which they will be accompanied by prison officials. A 2002 UN human rights report drew attention to 'systematic' torture in Uzbek prisons. United Kingdom Ambassador Craig Murray has been notably outspoken on human rights abuses in the country, while the US, under domestic pressure, has withheld some of its aid under the Strategic Partnership Framework.

Meanwhile, the United States itself has been criticised for attempting to restrict access by the International Committee of the Red Cross (ICRC) to prisons that it controls in Iraq. Following a written complaint by the ICRC on 6 November 2003, which detailed serious human rights violations observed during unannounced inspections in October 2003 at the Abu Ghraib prison, the US military demanded on 24 December that in future the ICRC make appointments to visit. The US refused to release the details of this letter, citing the confidentiality of communications with the ICRC. Although Washington has since initiated criminal investigations into the abuses alleged by the ICRC in Iraq, it has refused to grant a request by UN human rights investigators to visit detainees held at other, undisclosed detention facilities.

Sources 'UN investigating human rights violations in Ivory Coast', UN Wire, 9 July 2004, www.unwire.org; 'UN probes abuses in Ivory Coast', BBC News,

16 July 2004, <http://news.bbc.co.uk>; 'Ivory Coast "abuses" probed', News24.com, 16 July 2004, www.news24.com; 'US denies Uzbekistan \$18 million in aid, citing rights record', UN Wire, 14 July 2004, www.unwire.org; 'Uzbekistan allows outside inquiry of alleged torture death', UN Wire, 27 May 2004, www.unwire.org; 'Uzbekistan to allow human rights monitoring of some prisons', UN Wire, 28 May 2004, www.unwire.org; 'Officer says army tried to curb Red Cross visits to prisons in Iraq', *New York Times*, 19 May 2004, www.nytimes.com; 'UN rights experts demand access to US overseas prisons', UN Wire, 28 June 2004, www.unwire.org; <http://www.guardian.co.uk/guardian/politics/story/0,3605,1065795,00.html>.

Counter-terrorism monitoring

It is all go on the counter-terrorism front at the UN. Following the restructuring of the Security Council committees established under resolution 1267 (1999) and resolution 1373 (2004) (see *Trust & Verify* no. 113), the Security Council on 28 April 2004 adopted resolution 1540, requiring member states to establish and enforce national measures to prevent non-state actors from acquiring WMD and associated delivery systems. States must submit a report on their implementation efforts by 28 October to a Security Council committee set up under the resolution. While yet to begin its work, the committee, chaired by Romania, comprises all 15 Security Council members and has an initial mandate of two years. It can draw on expert assistance in assessing states' reports. Working relationships between the 1267, 1373 and 1540 committees have still to be determined.

South Korea, meanwhile, has called for the urgent conclusion of negotiations on additional terrorism instruments following the murder of one of its nationals in Iraq. The UN General Assembly's Ad Hoc Committee on Measures to Eliminate International Terrorism is considering two draft treaties, dealing with international terrorism and the suppression of nuclear terrorism respectively. A major sticking point is a mutually acceptable definition of terrorism, a challenge the Security Council has neatly sidestepped in its resolutions on this matter.

While the UN agency dealing with maritime transport, safety and related environmental issues, the International Maritime Organisation (IMO), has been shouldering additional responsibilities in responding to maritime security, its member states are evidently struggling to implement its new directives. The International Ship and Port Facility Security (ISPS) Code, an amendment to the 1974 Safety of Life at Sea Convention (SOLAS), is intended to improve ship and port security by requiring more transparent evidence of ship ownership and greater security of cargoes. Agreed in December 2002, the code entered

into force on 1 July 2004—one of the shortest entry-into-force periods for a maritime agreement. This resulted in an ‘administrative bottleneck’ at the IMO. Still, an estimated 86 percent of ships and 69 percent of port facilities had their security plans approved by 1 July.

Sources ‘Republic of Korea delegate urges General Assembly ad hoc committee to conclude draft treaties on international terrorism’, UN Press Release L/3072, 28 June 2004, www.un.org; ‘Security Council restructures Counter-Terrorism Committee, to strengthen implementation of 2001 anti-terrorism resolution’, UN Press Release SC/8041, 26 March 2004, www.un.org; ‘List of suspected terrorist organizations and individuals, national reports continue to play crucial role in fight against terror, Security Council told’, UN Press Release SC/8102, 25 May 2004, www.un.org; ‘SOLAS amendments and ISPS Code enter into force on 1 July 2004’, IMO Press Release, 30 June 2004, www.imo.org; ‘Secretary-General Mitropoulos pays tribute to the efforts made to implement the ISPS Code’, IMO Press Release, 1 July 2004; www.imo.org.

Chemical compliance slow

The US General Accounting Office, in a report released on the eve of the seventh anniversary of the entry into force (in 1997) of the 1993 Chemical Weapons Convention (CWC), has highlighted the slow progress being made in destroying existing chemical weapon (CW) stockpiles worldwide. Neither Russia nor the US, which together account for 95 percent of the world’s declared chemical weapons, will meet the 2012 deadline for the destruction of their entire stockpiles. As of April 2004 only 12.37 percent of the 71,000 metric tons of declared CW has been destroyed. The six states that have declared having CW are Albania, India, Libya, Russia, South Korea and the US.

In a separate GAO report, published in April 2004, it was confirmed that in the past six months very little of the American CW stockpile has been destroyed. Delays have been due to ‘incidents during operations, environmental permitting issues, concerns about emergency preparedness, and unfunded requirements’. The administration of President George W. Bush cut the budget for chemical demilitarization and reduced assistance to Russia.

On 23 July, however, Russia announced that it would double its spending on its CW disposal efforts in 2005 (US\$454 million, up from US\$184 million in 2004). And the US army announced on 20 July that the Anniston Army Depot in Alabama has completed incineration of rockets filled with liquid sarin nerve agent and is now set to begin destroying gelled sarin rockets. The incinerator is on schedule to complete all rocket and nerve agent destruction at the depot by 2010.

Meanwhile, China and Japan have agreed to build a CW disposal facility in China’s northern Jilin province in order to meet a 2007 deadline to destroy ‘old and abandoned’ stockpiles of munitions (not counted in the total declared stockpiles mentioned above) that were left behind by Japanese troops after the Second World War. Japan is fully funding the construction of the plant and is meeting the incineration costs for the approximately 700,000 chemical bombs and grenades.

Indonesia has admitted that five years after it ratified the CWC it too is still not fully implementing the accord. Makmur Widodo, Director General for Multilateral Political, Social and Security Affairs in the Indonesian Ministry of Foreign Affairs, identified two problems for the country:

- the establishment of a permanent CWC national authority, as required by the treaty; and
- the adoption of ‘unified, robust national legislation’ to govern the use of chemical substances in Indonesia.

The country is not alone in this respect: according to the Organisation for the Prohibition of Chemical Weapons (OPCW), only 33 percent of CWC states parties have reported adopting national implementation legislation.

Potential non-compliance also stems from another source: a US Department of Defense Advisory Panel has urged the US to pursue development of so-called calmativ agents to ‘deal with otherwise difficult situations in which neutralizing individuals could enable ultimate mission success’. The Advisory Panel also suggested, however, that the Pentagon investigate the technology’s ‘relationship to international treaty commitments’. There is controversy, including among states parties, about whether the development and use of non-lethal chemical agents would violate the CWC.

Sources US General Accounting Office, ‘Nonproliferation: delays in implementing the Chemical Weapons Convention raise concerns about proliferation’, GAO-04-361, Washington, DC, 31 March 2004; US General Accounting Office, ‘Chemical weapons: destruction schedule delays and cost growth continue to challenge program management’, GAO-04-644T, Washington, DC, 1 April 2004; ‘Pentagon panel suggests chemical calmativ agents’, Global Security Newswire, 21 April 2004, www.nti.org; ‘Indonesia vows to implement Chemical Weapons Convention’, *China View*, 15 April 2004, www.chinaview.cn; ‘Japan, China set to build chemical weapons disposal facility’, Global Security Newswire, 23 April 2004, www.nti.org; Jonathan B. Tucker and Paul F. Walker, ‘Bush funding cuts put chemical arms at risk’, *Boston Globe*, 29 April 2004, www.boston.com/news; ‘Russia plans to more than double chemical weapons disposal funding next year, official says’, Global Security Newswire, 26 July 2004; ‘Anniston depot destroys all liquid sarin rockets’, Global Security Newswire, 4 August 2004.



Verification goes mini and micro

Pill-size sensors are set to become the next innovation in information collection. The sensors, which can monitor temperature, vibrations, acceleration and particles, will be cheap and small enough to be used to monitor large areas. Their verification applications could include monitoring borders to detect the movement of troops and equipment and detecting the use of chemical and biological weapons. Production is expected to begin in 2004. Current sensors are the size of a pager.

Nanoscale optical fibres being developed at Harvard University in the US may also be used to detect CW. Inspectors could identify chemicals by placing certain receptors on the surface of the ultra-thin fibres.

The European Aerospace Defence and Space Company has developed a miniature spy helicopter that is particularly quiet, lacking the problematic 'whine' of other miniature helicopters. It can be easily assembled, fly for 25 minutes, and could be used for a range of verification purposes.

Land-based reconnaissance technology has also advanced in leaps and bounds, or rather, in this case, wriggles and slithers: a snake-like robot has been developed by BAE Systems to act as a battlefield spy. This robot, which could also be used for verification, employs advanced modular vertebral units and can 'adapt' if any of its segments is damaged: its novel software will identify other ways for it to move around.

Sources 'Tiny sentinels', *Defense News*, 19 January 2004, p. 22; 'Naked nanofibres are supersniffers of tomorrow', *New Scientist*, 27 December 2003–3 January 2004, p. 29; 'Miniature spy helicopter aims to hover unheard', *New Scientist*, 6 December 2003, p. 27; 'Robot spy keeps on slithering', *New Scientist*, 23 August 2003, p. 17.

Intelligence found . . .

Researchers at the New Mexico Institute of Mining and Technology in Socorro, US, have devised a data-mining technique using open source information that can assist in the detection of clandestine chemical or biological weapons research. The researchers claim that it is difficult to hide all evidence of a clandestine CW or BW programme, since laboratories will inadvertently give themselves away through open sources. Their technique assesses information such as records of scientific research partnerships, scientific publications and company websites. The technique apparently reveals the connections to be

expected if legitimate research is being conducted and those that indicate possible covert and illegitimate research. In testing their technique on publications issued by the State Research Center for Applied Microbiology at Obolensk, Russia, the team identified patterns that indicated the conduct of covert research between 1980 and 1990.

Source 'Bioweapons labs outed by own research', *Nature*, 2 June 2004, www.nature.com.

. . . and exposed

Words that have been blotted out in documents before they are declassified may no longer remain secret. Researchers at Dublin City University, Ireland, have used readily available computer programmes to identify words that have been blacked out in declassified US documents. Employing optical recognition techniques they have been able to identify the font type and the size of a missing word, based on the text around it, before scanning an electronic dictionary to find words of the right length that fill the gap. Unsuitable matches are evident on reading through the list of options, while possible matches can be checked against other sources.

The usefulness of the method is reduced when more than two or three consecutive words are missing, as the number of potential matches is much higher.

Source 'US intelligence exposed as student decodes Iraq memo', *Nature*, 13 May 2004, www.nature.com.

VERTIC Science Fellowship

VERTIC invites graduates with degrees in the physical sciences who are interested in working in the field of arms control and disarmament verification to apply for its new Science Fellowship. The three-month fellowship will provide a stipend of £1,500, as well as travel expenses to and from London. The deadline for applications is 17 September 2004, with a start date of October 2004.

For further details see the employment section at www.vertic.org or contact VERTIC's Networker & Information Officer, Jane Awford (jane.awford@vertic.org).

The inaugural Science Fellowship is funded by the Polden-Puckham Charitable Foundation.

VERTIC is moving!

VERTIC is moving to new offices at the end of September. The address will be 56–64 Leonard Street, London, EC2A 4LT, UK, and the main telephone number will be +44.(0)20.7065.0880. The new building is owned and operated by Ethical Properties, which leases office buildings to non-governmental organizations. We will be able to avail ourselves of common services and meeting spaces, as well as functioning in an NGO-friendly and ecologically-sound environment. The location is easily accessible by public transport, including the underground (the nearest tube station is Old Street) and Liverpool Street Station. The exact date of our relocation and further details will be posted on the VERTIC website closer to the time.

New Rowntree funding

VERTIC is delighted to announce that one of its oldest and most generous funders, the Joseph Rowntree Charitable Trust (JRCT), has provided a new two-year grant totalling £100,000 for core costs. VERTIC would like to express its gratitude to the staff and trustees of the JRCT for their continued and irreplaceable support.

VERTIC study for Canadian government

The Canadian Department for Foreign Affairs and International Trade (DFAIT) has commissioned VERTIC to produce a study on the current state of multilateral verification. The study, which is to be completed by September 2004, will form part of Canada's contribution to the deliberations of the Weapons of Mass Destruction Commission (known as the Blix Commission).

Study on enhancing multilateralism

VERTIC has joined Saferworld and the British American Security Information Council (BASIC) in a project to consider what might be done about the diverging views of Europe and the US on multilateralism. VERTIC is contributing in several areas, including the environment, WMD and anti-personnel landmines. The project is being supported by a grant of £21,000 from the Network for Social Change.

New interns join VERTIC

Benjamin Armbruster, from the US, and Erik Asplund, from Sweden, have joined VERTIC for three-month internships. Benjamin has a bachelor's degree in history from Ohio Univer-

sity, Cleveland, US, and is finishing a master's degree in international relations at King's College London. At VERTIC he is assisting with research on the United Nations Monitoring, Verification and Inspection Commission (UNMOVIC) and is helping with the Verification Organizations Directory (VOD). Erik has a bachelor's degree in modern history, economic history and politics from Royal Holloway, University of London, and is finishing a master's degree at the Department of Peace and Conflict Research, Uppsala University, Sweden. He will be assisting VERTIC with research on its arms control and disarmament verification programme, as well as with the VOD.

Staff news

TREVOR FINDLAY visited Washington, DC, from 16–21 June, where he attended the annual nonproliferation conference of the Carnegie Endowment for International Peace. He met with officers of the Nuclear Threat Initiative, the US Department of State, the Center for Strategic and International Studies (CSIS), the Incorporated Research Institutes of Seismology and the Carnegie Corporation of New York, along with Daryl Kimball, Executive Director of the Arms Control Association, and Michael Krepon, President Emeritus of the Henry L. Stimson Center. On 23 and 24 June he participated in a two-day workshop on 'cosmopolitan strategic culture' hosted by the Department of Politics and International Studies, University of Warwick, where he spoke on the use of force in UN peace operations. From 5–7 July he participated in a meeting with the UN Secretary-General's High-Level Panel on Threats, Challenges and Change, organized by the Japanese government, and held in Kyoto. He presented a paper on the idea of a standing UN WMD verification body (see www.vertic.org for text). On 13 July he was interviewed, along with Larry MacFaul, by James Wragg of the Esmée Fairbairn Foundation on funding NGO activity in the environmental field, and by Nick Green of the Royal Society as part of its research on NGOs generally. Trevor met with Shuichi Tokuda, First Secretary at the Japanese Embassy in London, on 14 July to discuss the outcome of the Kyoto meeting. He was interviewed by the Australian Broadcasting Corporation on 15 July regarding the post-Iraq WMD threat. Along with Angela Woodward, he met with Henrik Salander of the Blix Commission, and Rebecca Johnson, Executive Director of the Acronym Institute, at VERTIC's office on 22 July to discuss cooperation.

JANE AWFORD met with Nick Green of the Royal Society on 14 July to discuss how VERTIC evaluates the impact of its programmes and publications. Jane is coordinating recruitment for the inaugural VERTIC Science Fellowship. She and Ben Handley continue to keep VERTIC's website up to date. Jane is seeking to distribute back issues of the *Verification Yearbook* to British university and other libraries and is continuing to develop VERTIC's new online VOD.

KRISTIE BARROW attended the Meeting of States Parties to the Ottawa Convention in Geneva, Switzerland, in June as part of the delegation of the International Campaign to Ban Landmines (ICBL). She assisted Angela Woodward in compiling information on verification mechanisms for the Biological Weapons Convention (BWC) and the UN Secretary-General's fact-finding missions and is putting together a chronology of BW inspections. She also worked on the VOD.

BEN HANDLEY is supervising the relocation of VERTIC's office. He has attended meetings with Ethical Properties, and is

preparing the relocation budget. Ben coordinated the recruitment process for the Nuclear Arms Control and Disarmament Verification Researcher position. On 2 June he attended a Microsoft Technical Roadshow on Application Security and Desktop Migration. He continues to manage VERTIC's administration and to maintain its website.

LARRY MACFAUL gave a presentation on verification provisions in the Kyoto Protocol to the Working Group on Verification Technologies and Methodologies of the European Safeguards Research and Development Association (ESARDA), in Luxembourg on 2–3 June. He also attended the twentieth sessions of the Subsidiary Bodies to the UNFCCC in Bonn on 20–25 June, where he contributed to the Climate Action Network paper entitled 'Effective Participation in the UNFCCC Process'. He also provided VERTIC's environmental contribution to the joint BASIC/Saferworld/VERTIC study on enhancing multilateralism. He is continuing to compile information for a survey of implementation of national systems under the Kyoto Protocol.

Peace Missions Monitor

Sudan's monitoring miasma

Despite continuing reports of genocidal activity in Darfur in western Sudan, the UN Security Council's five permanent members have to date refused to intervene by authorizing a peacekeeping operation. The African Union (AU) has, however, now indicated its willingness to consider a force of up to 3,000 troops (up from an earlier pledge of 300), primarily from Nigeria, Rwanda and South Africa. Their mission would be to patrol refugee camps and to protect the approximately 96 unarmed AU monitors from Egypt, Ghana, Namibia, Nigeria and Senegal, who have been in the region since June. The observers have been attempting to monitor implementation of the ceasefire of 11 April 2004, which was supposed to stop attacks on the black African population by the government-backed Janjaweed militia. The UN is sending a team to Ethiopia to help set up the AU force; the Netherlands has offered airlift support; and the EU and the UK have offered unspecified assistance. So far the AU has investigated three of the six truce violations that have been reported to its ceasefire monitors. The monitors confirmed that during an attack on the village of Suleia the Janjaweed had burned civilians alive.

As a result of conflicting reports about the situation in Darfur, a joint mission, comprising UN ambassadors and officials and Sudanese government ministers and representatives, undertook a fact-finding mission in late July. The three-day mission aimed to assess militia activities, the degree of security and the future of the more than one million internally displaced persons. A meeting of the Joint Implementation Mechanism (JIM), a body created by the UN and Sudan on 3 July, is set to consider the mission's findings. On 30 July the UN Security Council passed a resolution threatening the Sudanese government with punitive measures if it does not demonstrate, within 30 days, progress in disarming the Janjaweed and bringing its members to justice.

In June, in a report to the Security Council, UN Secretary-General Kofi Annan called for the dispatch of an advance team to prepare for a peacekeeping mission in southern Sudan. The mandate of such a mission would be to coordinate the disarmament, demobilization and reintegration of former combatants, monitor the ceasefire agreements, facilitate the return of refugees and internally displaced persons, organize and oversee elections and destroy landmines. Due to the deteriorating situation in Darfur, however, the prospect of a UN peacekeeping mission being deployed to southern Sudan, which would require the cooperation and consent of the Sudanese government, appears bleak.

Sources 'Jonathan Clayton, 'Sudan stages rally to keep foreign forces out of Darfur', *The Times*, 5 August 2004, p. 30; 'UN sending mission to see if Sudan is meeting promises', UN Wire, 22 July 2004, www.unwire.org; 'Mission to Darfur will see whether Sudan is meeting pledges—UN envoy', UN News Service, 21 July 2004, www.un.org; 'African Union to send peace monitors to western Sudan', UN Wire, 16 April 2004, www.unwire.org; 'Annan urges African Union to act on Sudan's Darfur crisis', UN Wire, 6 July 2004, www.unwire.org; 'UN calls for Sudan to halt attacks by militias', *New York Times*, 30 July 2004, www.nytimes.com; 'Annan recommends advance team for UN mission to Sudan', UN Wire, 9 June 2004, www.unwire.org.

JESSICA MCLAUGHLIN continued to research nuclear verification issues and helped compile VOD entries. She completed her internship at VERTIC in mid-June and has returned to her studies at Stanford University. VERTIC is grateful for her assistance and wishes her well in her future career.

ANGELA WOODWARD attended a Chatham House meeting on 'Recent developments in transatlantic defence cooperation and arms control' on 2 June. She met with Scott Spence, the Harvard Sussex Program Researcher at the OPCW, on 14 June to discuss national implementation legislation for CBW treaties. During a visit to Washington, DC, she met with Isabelle Williams of the Chemical and Biological Arms Control Institute (CBACI) on 16 June to discuss BW arms control, observed a workshop at the CSIS on 17 and 18 June, and visited Jonathan Tucker at the Washington office of the Monterey Institute of International Studies (MIIS) on 18 June to discuss BW. In New York, on 21 June, Angela met with Ahmed El-Dawla of the UN

Security Council's Counter-Terrorism Committee to discuss its role in monitoring Security Council resolution 1373. She met with staff at the United Nations Department for Disarmament Affairs (UNDDA) on 22 June to talk about the UN Secretary-General's role in BW verification. On 29 June, at the London offices of The Diana, Princess of Wales Memorial Fund, she attended the book launch of *Mine action after Diana*. Angela chaired the Board meeting of the BioWeapons Prevention Project (BWPP) in Geneva on 18 July and its lunchtime seminar on 'Civil society thoughts on dealing with natural and deliberate outbreaks of disease' on 20 July. She represented VERTIC at the BWC Experts Meeting in Geneva from 19–23 July and presented its statement on 23 July. Angela completed a chapter on 'International regulations and agreements pertaining to bioterrorism' for the Encyclopedia of Bioterrorism Defense. She has also been coordinating a chapter for the BWPP's *BioWeapons Report* and is assisting with the editing of chapters for the *Verification Yearbook 2004*.

building trust through verification

VERTIC is the Verification Research, Training and Information Centre, an independent, non-profit making, non-governmental organisation. Its mission is to promote effective and efficient verification as a means of ensuring confidence in the implementation of international agreements and intra-national agreements with international involvement. VERTIC aims to achieve its mission through research, training, dissemination of information, and interaction with the relevant political, diplomatic, technical, scientific and non-governmental communities.

PERSONNEL Dr Trevor Findlay, *Executive Director*; Benjamin Armbruster, *Intern*; Erik Asplund, *Intern*; Jane Awford MA, *Information Officer & Networker*; Ben Handley, *Administrator*; Larry MacFaul, *Environment Researcher*; Angela Woodward BA (Hons), LL.B., LL.M., *Legal Researcher*.

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